



# PATENT SPECIFICATION

Application Date: Sept. 14, 1938. No. 26772/38.

519,176

Complete Specification Left: Sept. 9, 1939.

Complete Specification Accepted: March 19, 1940.

## PROVISIONAL SPECIFICATION

### Improvements in Ball and Socket Joints

We, JAMES NEALE & SONS LIMITED, a registered British Company, and ROWLAND WARWICK NEALE, a British Subject, both of the Company's address, 68, Graham Street, Birmingham, 1, do hereby declare the nature of this invention to be as follows:—

This invention relates to ball and socket joints, especially for motor accessories, for example, angularly adjustable lamps and observation mirrors, of the kind in which a ball member in the socket is pressed into frictional engagement with a seating therein by screw action to enable the part carried by the ball member to be rigidly secured to the socket after angular adjustment.

According to the present invention ball members are adapted to be clamped against seatings in opposite ends of the socket by a single screw actuated clamping member which laterally engages the socket and simultaneously presses clamping blocks therein in opposite directions against said ball members.

The said invention also consists of clamping blocks whose adjacent faces have a tapered groove engaged by a tapered cotter-pin passing through transverse holes in the socket and pulled up thereagainst by a nut, thereby wedging the blocks against the ball members according to the degree the nut is tightened.

According to an embodiment of the invention, the socket is made of two sections connected by screw-action, one of which is bored transversely with tapered holes for reception of the tapered cotter-pin screw-threaded at its small diameter

end. Two cylindrical clamping blocks, each having an arcuate seating in the outer end and a tapered diametric groove in the inner end, are located in the socket with their grooves engaged by the cotter-pin and their seatings adjacent the ball members, each of which is rigidly connected to means, such as an arm, carrying respectively an attachment bracket and a mirror fitting or lamp.

By tightening said nut against the wall of the socket, said pin is pressed against the grooved end of the blocks and causes displacement thereof at right-angles to the point of application of the force, thereby pressing said seatings against the ball members so that they are frictionally clamped against the aforesaid end seatings in the socket. Thus, the ball members and the part or parts they carry are simultaneously secured to the socket by simply tightening a single nut and are released by the reverse action.

It may be found desirable to employ a spring between the cotter-pin and the socket to assist in the releasing action.

Preferably each end of the socket adjacent the seating is cut away to enable the arm or the like being moved from a position co-axial with the socket through 90°.

Dated this 13th day of September, 1938.

For the Applicants:

GEORGE T. FUERY,  
Chartered Patent Agent,  
Newhall Chambers, 8, Newhall Street,  
Birmingham, 3.

## COMPLETE SPECIFICATION

### Improvements in Ball and Socket Joints

We, JAMES NEALE & SONS LIMITED, a registered British Company, and ROWLAND WARWICK NEALE, a British Subject, both of the Company's address, 68, Graham Street, Birmingham 1, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described

and ascertained in and by the following statement:—

The invention relates to adjustable ball and socket joints of that kind wherein two ball members arranged a distance apart within a socket in line are adapted to be frictionally clamped against seatings in the opposite ends of

said socket by operation of two clamping blocks set-up simultaneously by a single screw-actuated clamping member laterally applied to said socket.

5 In such a joint it has previously been proposed for the screw-actuated clamping member to traverse a ball or a wedge disposed between two incline-faced clamping blocks adapted to press against  
10 separate ball cups engaging the ball members.

The invention provides a ball and socket joint of the kind described but of a very much more simple construction  
15 and conveniently adapted for the purposes primarily in view, namely, for motor accessories such as, angularly adjustable lamps and observation mirrors.

20 The invention provides a ball and socket joint of the kind described, characterised by the screw-actuated clamping member being arranged to operate directly between the inner ends of the  
25 two clamping blocks, and by the outer ends of said clamping blocks being formed with arcuate seatings to contact the ball members.

Preferably the clamping blocks have a  
30 tapered groove in adjacent faces engaged by a tapered cotter-pin passing through co-axial holes in the socket and pulled up thereagainst by a nut, thereby pressing arcuate seatings in the blocks against  
35 the ball members according to the degree the nut is tightened.

The invention also provides in a ball and socket joint aforesaid, for a cylindrical socket having ball seatings at each  
40 end, for circular clamping blocks to fit within the socket, and for a circular and tapered cotter-pin to work laterally of the socket in co-axial holes to pull-up against the socket by a nut. It is also a  
45 constructive feature of the invention to form the socket in two pieces, and arrange same so that adjustments to an angle of  $90^\circ$  can be made in addition to universal adjustments over a useful  
50 range.

In order that the invention may be readily carried into effect one embodiment will now be described in conjunction with the accompanying drawings,  
55 wherein

Fig. 1 is a sectional elevation of a ball and socket joint;

Fig. 2 is a longitudinal sectional elevation of Fig. 1 with the ball members  
60 turned into different positions;

Fig. 3 is a composite view illustrating the components of the joint Figs. 1 and 2 before assembly.

A socket is made of two cylindrical  
65 sections 1, 2, connected by screw-action

at 3, and each is provided with a ball seating 4. The socket section 1 has two co-axial holes 5, 6, for reception of a tapered cotter-pin 7 screw-threaded at its small diameter end and having a clamping  
70 nut 8 to co-operate with the exterior of the section 1. Two cylindrical clamping blocks 9, each having an arcuate seating 10 in the outer end and a tapered groove 12 in the inner end, are located in  
75 the socket 1 with their grooves 12 engaged by the cotter-pin 7 and their seatings 10 co-operating with ball members 13, 14, whose stems or arms 15, 16, are rigidly connected respectively to an  
80 attachment bracket 17 and an accessory, such as a mirror fitting or lamp (not shown).

The holes 18 in the respective ends of the sections 1, 2, are large enough to  
85 admit of universal movement of the stems and the parts carried thereby through approximately  $15^\circ$  to the axis of the socket but in addition each hole has an opposed gap 19 whereby each stem may  
90 turn through  $90^\circ$  to said axis, the gaps being so arranged in this embodiment that the stems may be turned in opposite directions from a co-axial position  
95 through that angle; Fig. 2 illustrates the stems almost in that relationship.

By tightening said nut 8 against the wall of the socket 1, said pin is pressed against the grooved end 12 of the blocks 9 and causes displacement thereof at  
100 right-angles to the point of application of the force, thereby pressing the seatings 10 against the ball members 13, 14 so that they are frictionally clamped against the aforesaid end seatings 4, in  
105 the socket.

It may be found desirable to employ a spring between the cotter-pin and the socket to assist in the releasing action.

Having now particularly described and  
110 ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. Adjustable ball and socket joints of  
115 the kind described, characterised by the screw-actuated clamping member being arranged to operate directly between the inner ends of the two clamping blocks, and by the outer ends of said clamping  
120 blocks being formed with arcuate seatings for contact with the ball members.

2. Ball and socket joints in accordance with the preceding claim, and wherein the screw-actuated clamping member is  
125 a tapering cotter-pin, and the inner ends of the blocks are tapered to co-act therewith.

3. Ball and socket joints in accordance with claim 1 or 2, and wherein the socket  
130

is cylindrical with a ball seating at each end, the clamping blocks are circular to fit within the socket, and the screw-actuated clamping member, or cotter pin, 5 is disposed in co-axial holes in the socket to pull-up by a screw nut.

4. Ball and socket joints in accordance with the third claim, and wherein the socket is formed of two sections, as 10 described with reference to the drawings.

5. Ball and socket joints in accordance with any one of the preceding claims, and wherein the socket is provided to give an adjustment to each ball member up to

an angle of 90° in addition to a universal 15 adjustment over a useful range.

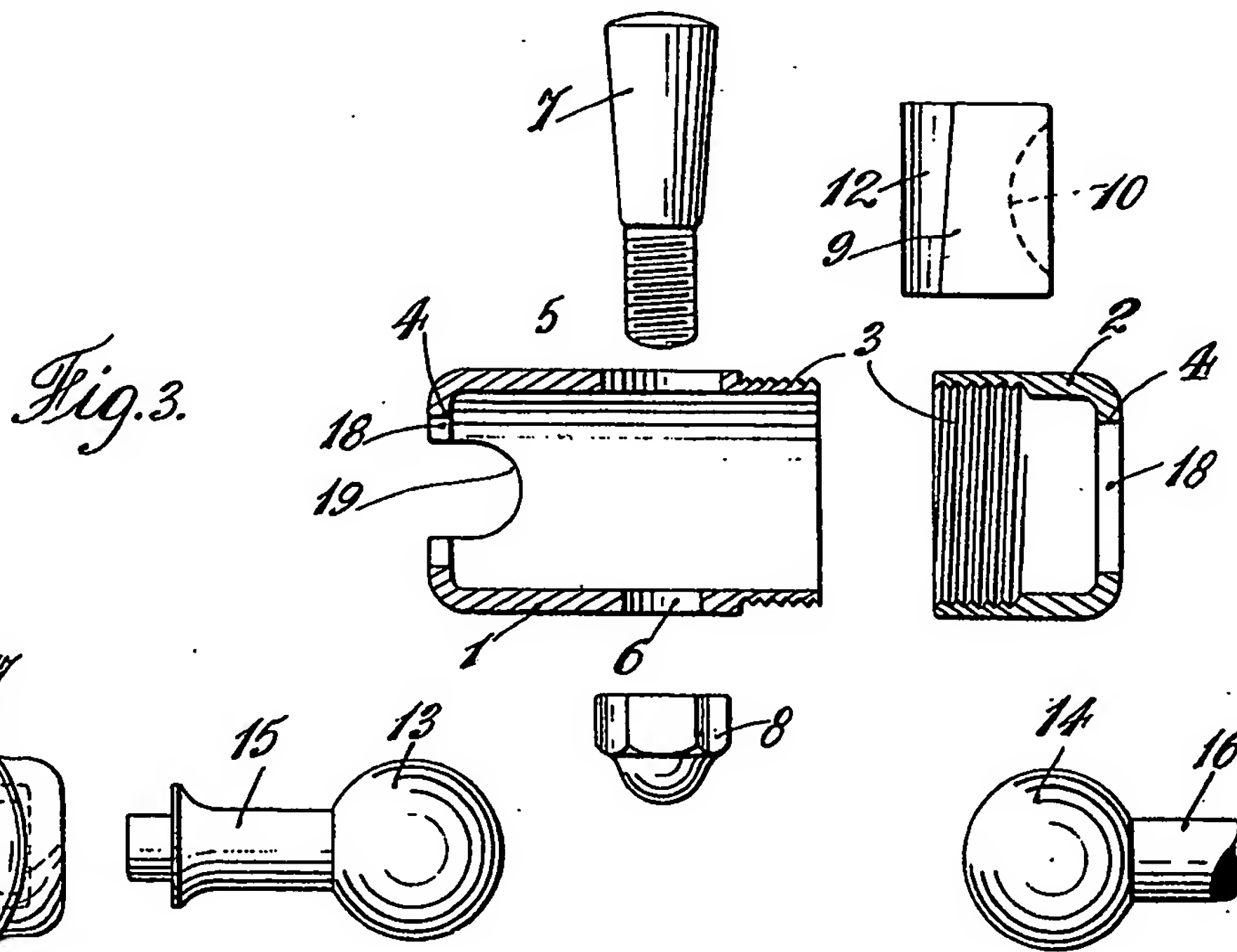
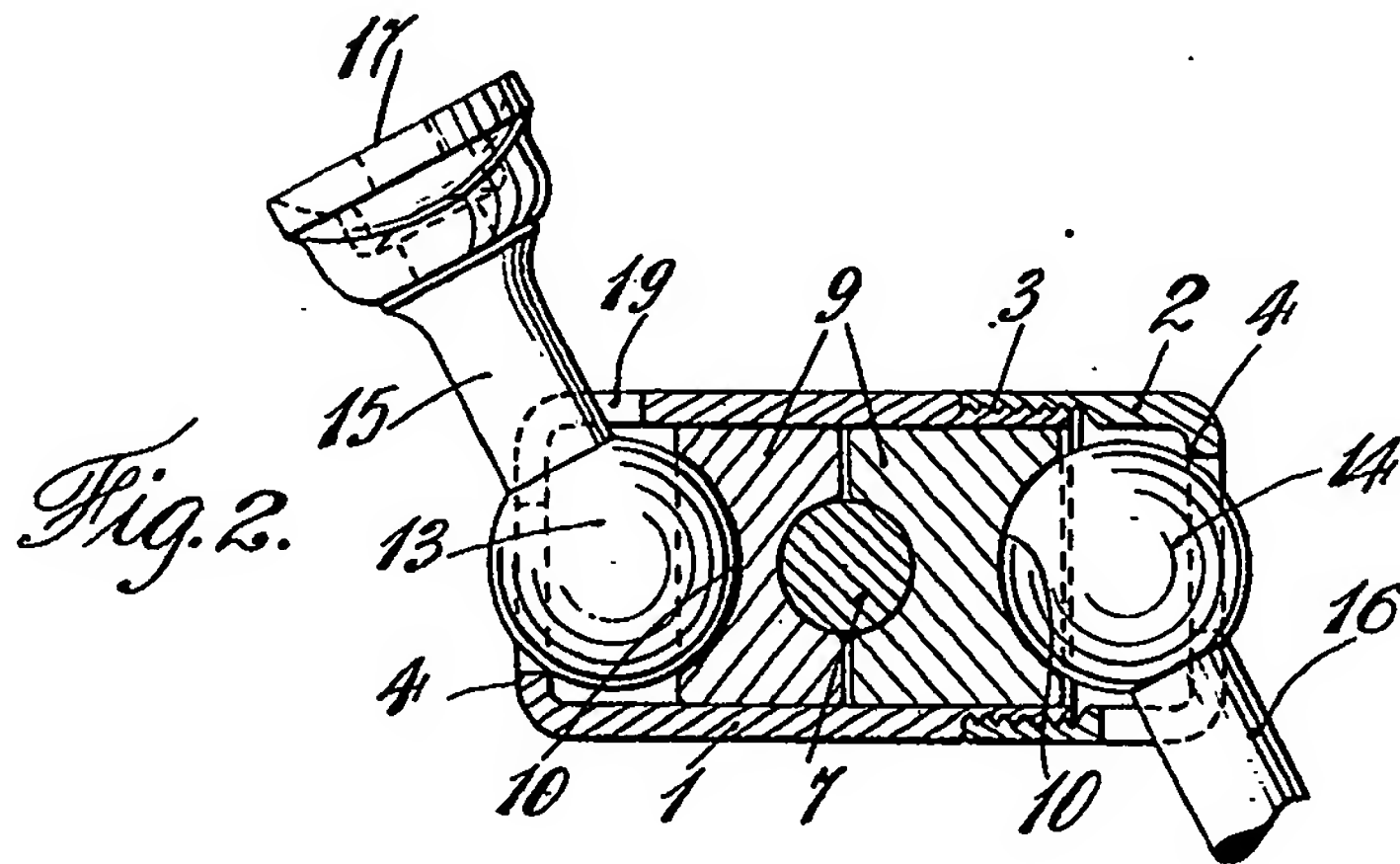
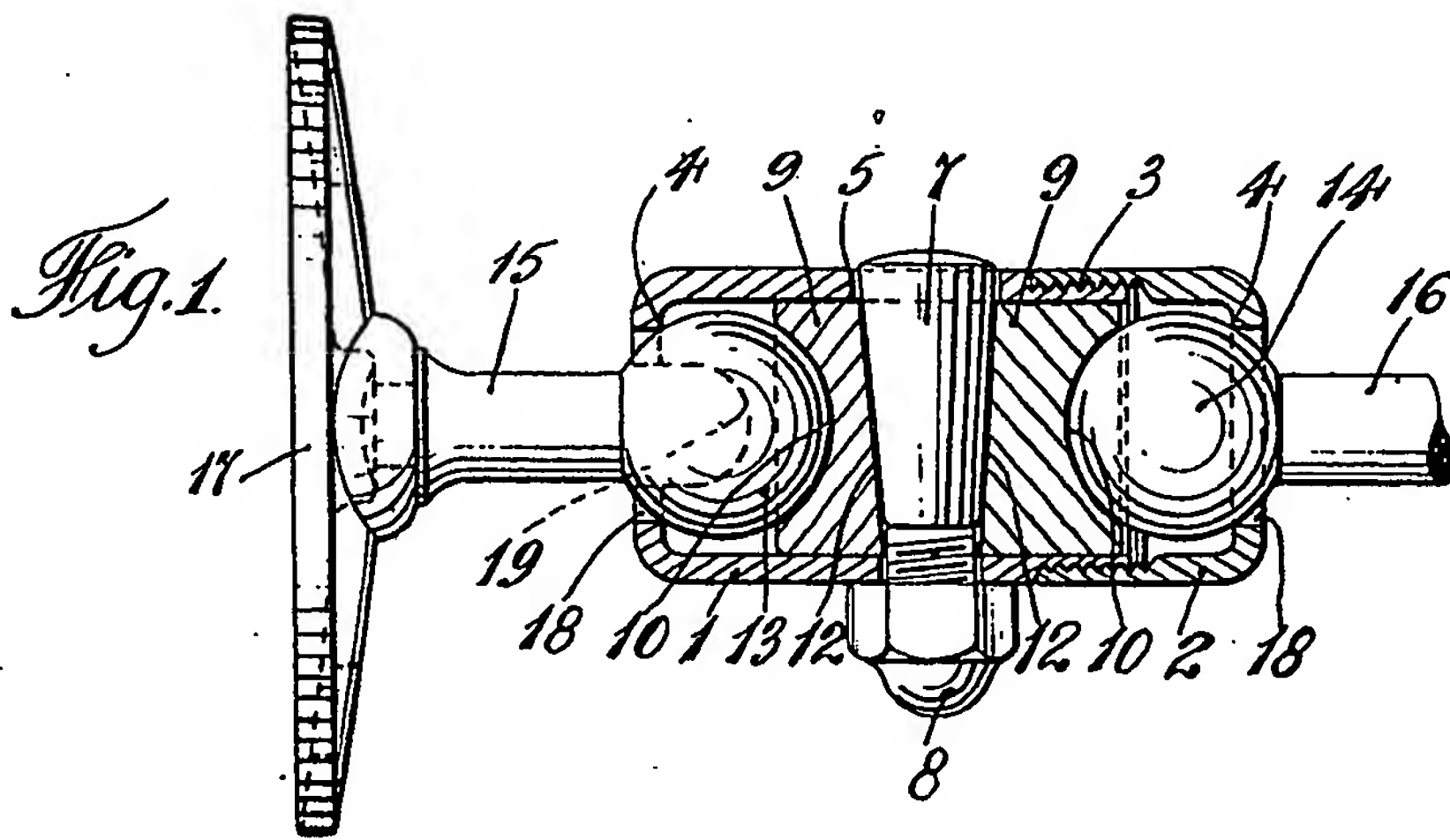
6. Improved ball and socket joints constructed, arranged and adapted to operate substantially as hereinbefore described with reference to the accompanying 20 drawings.

Dated this 8th day of September, 1939.

For the Applicants:

GEORGE T. FUERY,  
Chartered Patent Agent,  
Newhall Chambers, 8, Newhall Street,  
Birmingham, 3.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1940.





## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/014613A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 F16C11/10 F16M11/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 F16C F16M E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 417 566 A (FRANZ SACHS & CO KG) 20 March 1991 (1991-03-20)	1-4, 7-12, 15-19
A	the whole document	20-22
X	DE 101 22 533 A1 (EIDEN & SCHMIDT GMBH) 2 October 2002 (2002-10-02)  abstract; figures 1,4	1-4, 7-12, 15-19
X	DE 10 06 254 B (VOIGTLAENDER AKTIENGESSELLSCHAFT) 11 April 1957 (1957-04-11) figures 2,4 column 3, line 40 - column 4, line 42 column 4, line 53 - column 5, line 2  -/-	1-9, 11, 13, 15-19

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

15 April 2005

Date of mailing of the international search report

25/04/2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Maukonen, K

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/014613

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 635 871 C (W. & H. SEIBERT; OPTISCHES INSTITUT G.M.B.H) 25 September 1936 (1936-09-25) the whole document	1-3,5-9, 11-16, 18,19
X	GB 519 176 A (JAMES NEALE & SONS LIMITED; ROWLAND WARWICK NEALE) 19 March 1940 (1940-03-19) the whole document	1-18
X	US 5 419 522 A (LUECKE ET AL) 30 May 1995 (1995-05-30) the whole document	1-13, 15-19

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/014613

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0417566	A	20-03-1991	DE 8910801 U1 EP 0417566 A1	07-12-1989 20-03-1991
DE 10122533	A1	02-10-2002	NONE	
DE 1006254	B	11-04-1957	NONE	
DE 635871	C	25-09-1936	NONE	
GB 519176	A	19-03-1940	NONE	
US 5419522	A	30-05-1995	NONE	